Ontario

Ontario Ministry of Agriculture and Food

2003 SUPPLEMENT

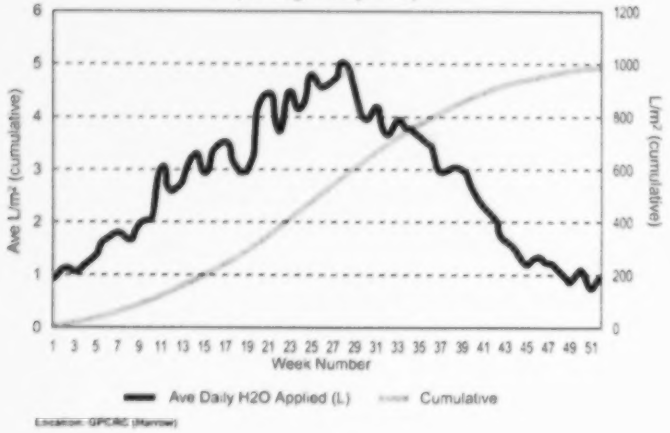
Growing Greenhouse Vegetables

Publication 371S

The Ontario Ministry of Agriculture and Food Web site address has been changed to www.gov.on.ca/omaf to reflect the recent ministry name change. This supplement contains updates to pesticides registered for 2002. For complete information, please refer to the full edition of Publication 371, *Growing Greeenhouse Vegetables,* released in 2001.

REMOVE Figure 2–7 on page 26 and REPLACE with the figure below.

FIGURE 2–7 Water Application — Greenhouse Vegetables
(Average Daily L/m²)



REPLACE Table 8–2, page 61 with the new table below.

TABLE 8–2. PEPPERS: Summary of Growing Recommendations

	Germination	Plant Raising	Transplanting	Harvest Stage	Full Harvest
Temp.					
Day °C	25°C	23°C	24°C	24°C	21°C
Night °C	25°C	21°C	21°C	21°C	18°C
EC (mS/cm)	0.0–1.0	1.0–2.0	1.5–2.5	2.0–3.0	2.0–3.0
pH	5.8	5.8	5.8	5.8	5.8
Vol. Of feed (L/day)		0.2–0.3	0.2–0.3	0.5–1.5	1.5–2.0
Feed Schedule		A	B	C	D

REPLACE Table 13–1, Table 13–2, Table 13–3, Table 13–4, Table 13–5, Table 13–6, Table 13–7 and Table 13–8 on pages 130 to 107 with the new tables below.

TABLE 13–1. Tomato Insect and Mite Pests

Pesticide	Rate	Pest	Pre-harvest Interval (days)	Remarks
Ambush 240 EC	420 mL/1,000 L	whiteflies	1	
Avid	30 mL/100 L	two-spotted spider mite leafminer	3	No more than 5 applications/crop cycle.
Bioprotec	1.8 L/1,000 L water. 0.9–1.8 L/1,000 L water.	cabbage loopers tomato hornworm	0	Use diluted spray within 12 hr. Use product within 6 months of manufacture date. Addition of a wetting agent is recommended to improve distribution on foliage.
Confirm 240F	0.6 L/ha	cabbage loopers	2	Re-entry period is 12 hr. Application interval at least 10 days. Do not exceed 4 applications/yr.
Dibrom	10 mL/100 m^3 Apply undiluted to cold pipes, then heat to 41°C and close greenhouse for at least 4 hr.	aphids, two-spotted spider mites, whiteflies	1	May cause injury to flowers.Ventilate greenhouse properly before re-entering.
Dipel 2X DF	75–150 g/250 L/ 4,000 m^2	cabbage loopers		Apply to upper and lower leaf surfaces to runoff. Repeat applications needed with new hatch.
Dyno-Mite	284 g/ha using 1,000 L water/ha	two-spotted spider mites	2	Maximum number of applications/crop cycle is 2. Apply at intervals of at least 28 days.
Foray 48B	80–200 mL/1,000 m^2	cabbage loopers	0	
Impower	16 g/80 L water/1,000 mature plants	whiteflies, aphids	1	Do not apply more than once per season. There may be repellent effects on bumble bees and negative effects on some beneficials.
Insecticidal Soap	1–2 L/100 L	aphids, two-spotted spider mites, whiteflies, earwigs, psyllids		May cause damage to flowers under high temperature conditions.
Nicotine Smoke	1 can/300 m^3	aphids, thrips	3	Ventilate greenhouse properly before re-entering.
Sluggo	25–50 kg/ha (2.5–5 g/m^2)	slugs and snails		Re-apply bait as needed or at least every 2 weeks if slugs and snails continue to be a problem.
Thiodan 4 EC Thiodan 50 WP	1.25–1.5 L/1,000 L 1–1.5 kg/ha	aphids, whiteflies	2	
Vectobac	2–8 L/1,000 L	fungus gnats	0	Do not mix and apply with fertilizers or fungicides containing copper or chlorine as this may neutralize the active ingredients.
Vendex 50W	50 g/100 L	two-spotted spider mites	5	

TABLE 13–2. Tomato Diseases

Pesticide	Rate	Disease	Pre-harvest Interval (days)	Remarks
Botran 75WP	1.75 kg/1,000 L	botrytis grey mould	1	Seedlings may be injured by drenching.
Exotherm Termil	1 can/100 m^3	botrytis grey mould		Do not apply when greenhouse temperature is above 24°C. Be certain that all foliage and blossoms are dry. Ventilate greenhouse at least 2 hr before re-entering.
Maestro 80DF	1.25 kg/1,000 L apply 50–85 L/100 m^2	damping-off in seedlings		
Manzate DF	2.4 kg/ha	early and late blight, septoria leaf spot	7	
Mycostop	Immediately after transplanting: 10–50 mg/plant or 20–100 mL/plant of 0.05% suspension	fusarium; root diseases; stem rot	0	Treatments to be repeated at intervals of 36 weeks depending on disease pressure.
No-Damp	10 mL/1 L	damping-off diseases in seedlings		
Nova	340 g/ha (1,000 L water/ha)	powdery mildew	3	Apply no more than 2 applications/yr.
Rovral 50WP	1 kg/1,000 L	botrytis grey mould	2	
Sulphur (Bartlett's Microscopic Sulphur 92 %)	750 g/1,000 L/ha	powdery mildew	1	Maximum of 10 applications/crop cycle. May cause slight foliage damage.

TABLE 13–3. Cucumber Insect and Mite Pests

Pesticide	Rate	Pest	Pre-harvest Interval (days)	Remarks
Ambush 240 EC or Pounce EC	420 mL/1,000 L 260 mL/1,000 L	whiteflies	1	
Avid	30 mL/100 L	two-spotted spider mite leafminer	3	No more than 5 applications/crop cycle.
Bioprotec	1.8 L/1,000 L water	cabbage loopers	0	Use diluted spray within 12 hr. Use product within 6 months of manufacture date. Addition of a wetting agent is recommended to improve distribution on foliage.
Dibrom	10 mL/100 m^3 Apply undiluted to cold pipes, then heat to 41°C & close greenhouse for at least 4 hr	aphids, spider mites, whiteflies, mealy bugs, leafrollers	1	May cause injury to flowers. Ventilate greenhouse properly before re-entering.
DynoMite	284 g/ha 1,000 L water/ha	two-spotted spider mites	2	Maximum number of applications per crop cycle is 2. Apply at intervals of at least 28 days.
Foray 48B	80–200 mL/1,000 m^2	cabbage loopers	0	
Impower	16 g/80 L water/1,000 mature plants	whiteflies, aphids	1	Do not apply more than once per season. There may be negative effects on some beneficials.
Insecticidal Soap	1–2 L/100 L	aphids, two-spotted spider mites, whiteflies, earwigs, psyllids		May cause damage to plant under high temperature conditions.
Nicotine Smoke	1 can/300 m^3	aphids, thrips	3	Ventilate greenhouse properly before re-entering.
Sluggo	25–50 kg/ha (2.5-5g/m^2)	slugs and snails		Re-apply bait as needed or at least every 2 weeks if slugs and snails continue to be a problem.
Thiodan 4 EC Thiodan 50 WP	1.25–1.5 L/1,000 L 1–1.5 kg/ha	aphids, whiteflies	2	
Vectobac	2–8 L/1,000 L	fungus gnats	0	Do not mix and apply with fertilizers or fungicides containing copper or chlorine as this may neutralize the active ingredients.
Vendex 50W	50 g/100 L	two-spotted spider mites	3	

TABLE 13–4. Cucumber Diseases

Pesticide	Rate	Disease	Pre-harvest Interval (days)	Remarks
Mycostop	Immediately after transplanting: 10–50 mg/ plant or 20–100 mL/plant of 0.05% suspension	fusarium; root diseases; stem rot	0	Treatments to be repeated at intervals of 3–6 weeks depending on disease pressure.
No-Damp	10 mL/1 L	damping-off diseases in seedlings		
Nova	340 g/ha	powdery mildew, gummy stem blight	2	Do not apply more than 6 times per year.
Previcur	10 mL/10 L of water and apply this solution at rate of 100–200 mL/ plant. Use higher rate for 2nd and 3rd applications.	pythium root rot	14	Maximum of 3 applications per season. Occasional slight damage may occur following overhead drenching of recently planted seedlings.
Sporodex	7.5 L/ha	powdery mildew	0	Begin weekly applications at first sign of mildew. Re-entry period is 4 hr.
Rovral	1 kg/1,000 L	botrytis grey mould, gummy stem blight	2	
Microfine Sulphur 92 (Zeneca)	150 g per 100 L	powdery mildew	1	Can cause damage if applied under hot, humid conditions.

TABLE 13–5. Pepper Insect and Mite Pests

Pesticide	Rate	Pest	Pre-harvest Interval (days)	Remarks
Avid	30 mL/100 L	two-spotted spider mite	3	
Basudin 500 EC or Diazinon 500	230 mL/250 L/4,000 m^2 0.575 L/625 L water	aphids	5	
Bioprotec	1.8 L/1,000 L water	cabbage loopers	0	Use diluted spray within 12 hr. Use product within 6 months of manufacture date. Addition of a wetting agent is recommended to improve distribution on foliage.
Confirm	0.5 L/ha; apply in 4,000 L water/ha	European corn borer	3	Ensure good coverage and apply at intervals of approximately 7 days. Do not exceed 4 applications per year. Re-entry interval is 12 hr.
Dipel 2X DF	75–150 g/250L/ 4,000 m^2	cabbage loopers		Apply to upper and lower leaf surfaces to runoff. Repeat applications needed with new hatch.
DynoMite	284 g/ha	two-spotted spider mite	3	Maximum number of applications per year is 2.
Foray 48B	80–200 mL/1,000 m^2	cabbage loopers	0	
Insecticidal Soap	1–2 L/100 L	aphids, spider mites, whiteflies, earwigs, psyllids	5	May cause damage to plant under high temperature conditions
Nicotine Smoke	1 can/300 m^3	aphids, thrips	5	Ventilate greenhouse properly before re-entering.
Sluggo	25–50 kg/ha (2.5–5g/m^2)	slugs and snails		Re-apply bait as needed or at least every 2 weeks if slugs and snails continue to be a problem.
Thiodan 4 EC	1.25–1.5 L/1,000 L	lygus bug or tarnished plant bug, aphids	2	Do not apply more than twice per season.
Vectobac	2–8 L/1,000 L	fungus gnats	0	Do not mix and apply with fertilizers or fungicides containing copper or chlorine as this may neutralize the active ingredients.

TABLE 13–6. Pepper Diseases

Pesticide	Rate	Disease	Pre-harvest Interval (days)	Remarks
Maestro 80DF	1.25 kg1,000 L – apply 50–85 L/100 m^2	damping-off in seedlings		
Mycostop	Immediately after transplanting: 10–50 mg/plant or 20–100 mL/plant of 0.05% suspension	fusarium; root diseases; stem rot	0	Treatments to be repeated at intervals of 3–6 weeks depending on disease pressure
No-Damp	10 mL/1 L	damping-off diseases in seedlings		
Nova	340 g/ha using 1,500–3,000 L water/ha.	powdery mildew	3	Apply as soon as possible after initial infection and again 12 days later when disease pressure warrants control. Maximum number of applications per crop cycle is 3. Re-entry interval is 12 hr.

TABLE 13–7. Lettuce Insect and Mite Pests

Pesticide	Rate	Pest	Pre-harvest Interval (days)	Remarks
Bioprotec	1.8 L/1,000 L water	cabbage loopers	0	Use diluted spray within 12 hr. Use product within 6 months of manufacture date. Addition of a wetting agent is recommended to improve distribution on foliage.
Confirm 240F	0.6 L/ha	cabbage loopers	14	Re-entry period is 12 hr. Application interval 10–14 days. Do not exceed 2 applications/year.
Foray 48B	80–200 mL/1,000 m^2	cabbage loopers	0	
Insecticidal Soap	1–2 L/100 L	aphids, spider mites, whiteflies, earwigs, psyllids		May cause damage to plant under high temperature conditions.
Malathion 25W	2.75–5.5 kg/ha	aphids, caterpillars, spider mites, thrips, whiteflies	Leaf = 21 Head = 7	Do not apply more than twice per season.
Nicotine Smoke	1 can/300 m^3	aphids, thrips	7	Ventilate greenhouse properly before re-entering.
Thiodan 4 EC	1.25–1.5 L/1,000 L	aphids	14	Only one application per crop; low volume mist or high volume spray.
Vectobac	2–8 L/1,000 L	fungus gnats	0	Do not mix and apply with fertilizers or fungicides containing copper or chlorine as this may neutralize the active ingredients.

TABLE 13–8. Lettuce Diseases

Pesticide	Rate	Disease	Pre-harvest Interval (days)	Remarks
No-Damp	10 mL/1 L	damping-off diseases in seedlings		
Rovral	1 kg/1,000 L	grey mould	14	

REPLACE Appendix B with the new version below.

Appendix B. Ontario Ministry of the Environment Pesticide Control Offices

REGION County	PESTICIDES OFFICER Address	Telephone
Central Region Toronto, Halton, Peel, York, Durham	**Charles Zubovits** **Cathy Wright** 5775 Yonge St, 8th Floor Toronto, Ontario M2M 4J1	(416) 326-8600 Toll Free 1-800-810-8048 Fax (416) 325-6347
West-Central Region Haldimand-Norfolk, Niagara, Hamilton-Wentworth, Dufferin, Wellington, Waterloo, Brant	**Charlie Roland** Ontario Government Building 119 King St. West, 12th Floor Hamilton, Ontario L8P 4Y7	(905) 521-7640 Toll Free 1-800-668-4557 Fax (905) 521-7820
Eastern Region Frontenac, Hastings, Lennox & Addington, Prince Edward, Leeds & Grenville, Prescott & Russell, Stormont/Dundas & Glengarry , Haliburton, Peterborough, Victoria, Northumberland, Renfrew, Ottawa-Carleton, Lanark, District of Nipissing (Twsps of Airy, Murchison, Dickens, Lyell and Sabine)	**Roberto Sciilotto** 133 Dalton Avenue P.O. Box 820 Kingston, Ontario K7L 4X6	(613) 549-4000 Fax (613) 548-6908 Toll Free 1-800-267-0974 (in Eastern region only)
Southwestern Region Elgin, Middlesex, Oxford, Essex, Kent, Lambton, Bruce, Grey, Huron, Perth, Simcoe	**Gary Roberts** 733 Exeter Road London, Ontario N6E 1L3	(519) 873-5000 Toll Free 1-800-265-7672 Fax (519) 873-5020
Northern Region East Manitoulin, Nipissing, Parry Sound, Sudbury, Algoma East, Cochrane East, Muskoka	**John Negassatti** 199 Larch Street, Ste 1101 Sudbury, Ontario P5E 5P9	(705) 564-3249 Fax (705) 564-4180
Northern Region West Kenora, Rainy River, Thunder Bay, Algoma West, Cochrane West, Timmins	**Don Mitchell** 435 James St. S., Suite 331 Thunder Bay, Ontario P7E 6S7	(807) 475-1712 Toll Free 1-800-875-7772 Fax (807) 475-1745
Standards Development Branch	**Pesticides Section** 40 St. Clair Avenue West, 7th Floor Toronto, Ontario M4V 1M2	(416) 327-5519 Fax (416) 327-2936
Approvals Branch	**Pesticides Licensing** 2 St. Clair Avenue West, 12A Floor Toronto, Ontario M4V 1L5	(416) 314-8001 Toll Free 1-800-461-6290 Fax (416) 314-8452

REPLACE Appendix C, page 110, with the following table

Appendix C. Accredited Soil-Testing Laboratories in Ontario

The following labs are accredited to perform soil tests for pH, buffer pH, P, K, Mg and Nitrate-N on Ontario soils.

Laboratory Name	Address	Telephone/Fax/E-mail	Contact
A & L Canada Laboratories East Inc. Web site: www.al-labs-can.com	2136 Jetstream Rd LONDON, ON N5V 3P5	Tel: (519) 457-2575 Fax: (519) 457-2664 E-mail: agrifo@al-labs-can.com	Mr. Greg Patterson Mr. Ian McLachlin
Accutest Laboratories Web site: www.accutestlabs.com	146 Colonnade Rd Unit #8 NEPEAN, ON K2E 7Y1	Tel: (613) 727-5692 Fax: (613) 727-5222 E-mail: phaulena@accutestlabs.com	Mrs. Lorna Wilson Mr. Peter Haulena
Agri-Food Laboratories Web site: www.agfood.com	503 Imperial Rd Unit #1 GUELPH, ON N1H 6T9	Tel: (519) 837-1600 1-800-265-7175 Fax: (519) 837-1242 E-mail: lab@agfood.com	Mr. Dale Cowan Ms. Nora Wilson
Brookside Laboratories Inc.	308 South Main St NEW KNOXVILLE, Ohio 45871	Tel: (419) 753-2448 Fax: (419) 753-2643 E-mail: nfisher@blinc.com	Ms. Nicole Fisher Mr. Mark Flock
Soil and Nutrient Laboratory	University of Guelph P.O. Box 3650 95 Stone Rd W GUELPH, ON N1H 2W1	Tel: (519) 767-6226 Fax: (519) 767-6240 E-mail: vkerrioki@lsd.uoguelph.ca	Ms. Virginia Kerrioka
Stratford Agri Analysis (A Dairo Laboratories Ltd.)	1131 Erie St Box 760 STRATFORD, ON N5A 6W1	Tel: (519) 273-6611 1-800-323-9089 Fax: (519) 273-6611 E-mail: saa@laboratories.com	Mr. Dale Peters Mr. Keith Lamp

There is no official accreditation in Ontario for tissue analysis, but all the accredited soil-testing labs are monitored for proficiency in tissue analysis.

Record all editions of this supplement. Ask you the appropriate working group of the Ontario Pest Management Research and Service Committee reviews the pesticides listed in this publication. To the best knowledge of the committee, at the time of printing, all of these pesticides were:

- Actively registered
- reviewed by the Ontario Pesticides Advisory Committee (OPAC)
- classified by the Ministry of the Environment as of November 2002.

The information in this publication is general information only. By printing this publication, the Ministry of Agriculture and Food does not offer any warranty or guarantee, nor does it assume any liability for any crop loss, animal loss, health, safety or environmental hazard caused by the use of a pesticide mentioned in this publication.

The pesticide product label is a legal document. It is against the law to use the product in any other way. You must also use all pesticides in accordance with the *Pesticides Act* and Regulations it is administered by the Ontario Ministry of the Environment.

In this publication, most recommendations for several pesticides list when to use for each pest discussed. In general the best insecticide materials are those pesticides that pesticide applicators have used satisfactorily for years are listed first. More than pesticides and/or mixtures with less practical proven experience follow.

This publication lists a number of brand names of pesticides. This is for your convenience only. It is neither an endorsement of the product nor a suggestion that similar products are ineffective.

Consult each product label for specific information such as compatibility with other materials and the effect of environmental conditions. Weather and other factors influence the effectiveness of pesticides and the likelihood of crop injury.

Health Canada has established maximum residue limits (MRLs) for pesticides. Processors or retailers may demand more restrictive limits. Growers should seek advice if their intended market is to which restrictions or limitations apply. Keep accurate and up-to-date records on pesticide use in each crop.

Federal Registration of Pesticide Products

The Pest Management Regulatory Agency (PMRA) of Health Canada grants registration following an evaluation of scientific data to ensure that the product has merit and value, and the human health and environmental risks associated with its proposed use are acceptable.

1. **Full Registration**

Pesticide registrations are normally granted for a period of five years, subject to renewal.

2. **Temporary Registration**

Temporary registration may be granted for a period of up to several one year, where the registrant agrees to produce additional scientific or technical information, or the pesticide is used for emergency control of a serious pest outbreak.

Supplemental Labels

You MUST obtain a supplemental label and follow all the label directions when PMRA approves the use for a registered pesticide that is not shown on the current label.

Examples of when you must use a supplemental label include:

- **Temporary Registrations for Emergency Use**
- **Minor Use Label Expansions** new label statements for crops that are not already shown on that product label.

You can obtain a copy of a supplemental label from the pesticide manufacturer or pesticide dealer. An online application for permission for emergency registration of minor use from OMAF or PMRA, Pest Management Information Service.

For more information on the federal registration status check the PMRA Web site at www.hc-sc.gc.ca/pmra-arla/ or call 1-**800-267-6315**.

Regulation of Pesticides in Ontario

Classification of Pesticides into "Schedules"

The Ministry of the Environment classifies all pesticide products into one of six **schedules**, based on the potential hazards that product may have to human health and the environment. For up-to-date information on the regulatory status of any pesticide check the Ontario Pesticides Advisory Committee Web site at www.epa.gov.on.ca or call (416) 314-8326 fax (416) 314-8327.

Licensing and Certification Requirements for Pesticide Users

You must be a certified grower or licensed exterminator to buy and use Schedule 1, 2 and 3 pesticides.

Requirements for Growers and their Assistants

Growers must be certified through the **Grower Pesticide Safety Course** to buy and use Schedules 1, 2 or 3 pesticides on land they farm. There must be at least one certified grower for each farm operation.

All agricultural assistants must also receive formal pesticide safety training, recognized by the Ministry of the Environment, before they can use Schedule 2 or 3 pesticides under the supervision of a certified grower. This applies to all assistants — including family members, farm employees and seasonal workers.

For more information about training for growers and agricultural assistants check the Ontario Pesticides Education Program Web site at www.ridgetown.uoguelph.ca/opep or call 1-**800-652-8573**.

Requirements for Commercial Applicators and their Assistants

If you plan to apply pesticides as a business, you must be a licensed exterminator. **This includes farmers who custom apply pesticides for other farmers and charge a fee for this service.** You must complete a home study course and certification exam, and send proof of certification to the Ministry of the Environment to obtain your licence.

Unlicensed assistants must be technicians before they may handle Schedule 3 (with restrictions), 4, 5 and 6 products under direct supervision of a licensed exterminator. Technicians may also handle Schedule 1 and 2 products. For more information about exterminators and technicians check the Ontario Pesticide Training and Certification Web site at www.ridgetown.uoguelph.ca/opep or call 1-**888-542-5888**.

Cette publication est aussi disponible en français.

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